

INFORMATION FOR CEE PROGRAM ADMINISTRATORS ON THE NEW PART LOAD EFFICIENCY METRIC FOR UNITARY COMMERCIAL HVAC EQUIPMENT

This document is intended for use by voluntary energy efficiency program administrators who are responsible for the planning or implementation of commercial unitary air conditioning (AC) or heat pump (HP) efficiency programs. The information contained in the document is intended to provide basic facts about the new part load cooling efficiency metric called Integrated Energy Efficiency Ratio (IEER) and provide references to relevant resources. In the interim period until CEE adopts new part load efficiency criteria to replace IPLV in the Initiative, Participants may either choose to wait to adopt the CEE criteria or adopt the IEER values that AHRI recommended to ENERGY STAR or to ASHRAE. Those values are included in Table 1 in this document.

BACKGROUND: On January 1, 2010, a new part load cooling efficiency metric, Integrated Energy Efficiency Ratio (IEER), will replace the previous metric, Integrated Partial Load Value (IPLV) for unitary HVAC equipment ≥ 65 k Btu/h in the ASHRAE standard 90.1-2007. After January 1, HVAC equipment manufacturers will test their products to meet IEER, not IPLV, and AHRI will only report IEER values in the AHRI equipment directory.

Currently, the CEE Unitary AC and HP specification defines part load efficiency using the IPLV performance metric. IEER data is not publicly available at this time. As IEER data is reported in the AHRI Directory starting January 1, 2010, the CEE Commercial HVAC Committee will review the metric and the data. As with all CEE specification updates, any proposed changes to the Unitary AC and HP Specification will be fully vetted with the CEE committee, affected industries and stakeholders prior to any proposal to the CEE Board of Directors to amend the specification. At this time, the CEE HVAC Committee anticipates beginning a thorough vetting process and consideration of appropriate part load criteria in the first quarter of 2010.

Frequently Asked Questions on Integrated Energy Efficiency Ratio (IEER) Metric

1. What is the Integrated Energy Efficiency Ratio (IEER)?

AHRI Standard 340/360 2007 defines IEER as "a single number figure of merit expressing cooling part-load EER efficiency for commercial unitary air-conditioning and heat pump equipment on the basis of weighted operation at various load capacities for the equipment."

2. Does IEER apply to all commercial unitary HVAC systems?

It applies to unitary equipment ≥ 65 k Btu/hr. It does not impact the CEE/AHRI Verified Directory, which applies to equipment < 65 k Btu/hr (<http://www.ceedirectory.org/>).

3. Who developed IEER?

The new IEER (as well as IPLV) test method was developed within the AHRI Unitary Large Equipment Engineering working group. It was then updated in standard AHRI 340/36-2007 and accepted by ASHRAE in May 2008 for adoption on January 1, 2010.

4. How is IEER different from Integrated Partial Load Value (IPLV)?

IEER is a result of industry's response to improving the test method for IPLV. The previous test method did not consistently set part load capacities and therefore did not accurately represent efficiencies for units with multi-stage compressors. The new test method requires ratings at specific load conditions (100%, 75%, 50% and 25%) with a sliding ambient temperature scale as opposed to a fixed ambient temperature of 80^oF. The new test method also takes into account continuous indoor fan power. The updated test method is defined in AHRI 340/360-2007 located at:

http://www.ahrinet.org/Content/StandardsProgram_20.aspx.

5. When will IEER replace IPLV?

On January 1, 2010, IEER will supersede IPLV in the AHRI certification program. As a result, IPLV will no longer be listed in the AHRI Directory for Unitary Large Equipment. The directory can be found at: http://www.ahrinet.org/Content/UnitaryLargeEquipment_100.aspx.

6. How are upcoming federal minimums, ASHRAE 90.1, Natural Resources of Canada and ENERGY STAR defining IEER?

On January 1, 2010, new federal minimums will go into effect for unitary equipment $\geq 65k$ btu/hr as defined in EPACK 2005. While part load metrics were not defined in EPACK 2005, ASHRAE 90.1 - 2007 will include a supplement that will go into effect on January 1, 2010 with several addendums including addendum s which defines IEER based upon suggestions from AHRI (<http://www.ashrae.org/technology/page/132>). Since IEER is not defined at the federal level, the appropriate state authority (e.g., state energy office) will have the option to adopt IEER values as defined by ASHRAE in 2010. In addition, as of January 1, 2010, NRCan identified minimum performance levels for unitary equipment, similar to ASHRAE. Finally, on December 1, 2009, ENERGY STAR finalized their specification for Light Commercial HVAC equipment. The levels adopted by ENERGY STAR will go into effect on May 1, 2010 and include performance levels for IEER. The ENERGY STAR specification is available at this link:

http://www.energystar.gov/index.cfm?fuseaction=products_for_partners.showLCHVAC.

7. How did ENERGY STAR determine the IEER levels for their specification?

Currently, there is no publicly available data set that shows how commercial unitary HVAC equipment performs against the new metric IEER. The values provided to ENERGY STAR are based upon AHRI recommendations made in February 2009 using a small sample set of data. Table 1 summarizes the EER and IEER values for equipment <240k Btu/hr in ASHRAE 90.1-2007 and the final ENERGY STAR Light Commercial Unitary HVAC Specification.

8. Is there any relationship between IPLV and IEER? How about IEER and EER?

There is no direct correlation between IEER and IPLV or between IEER and EER. The Committee will be exploring these relationships further as it considers updates to the specification. In the ENERGY

STAR specification EPA uses a 0.1 difference between IEER and EER while ASHRAE uses a 0.2 difference in 90.1-2007 for equipment <240k btu/h.

Table 1 - Comparison of Performance Levels for Unitary AC equipment $\geq 65k$ Btu/hr

Size Category (Btu/hr)	Heating Section Type	Federal Minimums (1/1/2010)	ASHRAE 90.1-2007 (1/1/2010)	EER IEER Δ	ENERGY STAR (5/1/2010)	EER IEER Δ	CEE Tier 1 (Current)	CEE Tier 2 (Current)
$\geq 65k$ - $< 135k$	Electrical Resistance	11.2 EER	11.2 EER 11.4 IEER	0.2	11.7 EER 11.8 IEER	0.1	11.7 EER	12.2 EER
	All Others	11.0 EER	11.0 EER 11.2 IEER	0.2	11.5 EER 11.6 IEER	0.1	11.5 EER 11.9 IPLV	12 EER 12.4 IPLV
$\geq 135k$ - $< 240k$	Electrical Resistance	11.0 EER	11.0 EER 11.2 IEER	0.2	11.7 EER 11.8 IEER	0.1	11.7 EER	12.2 EER
	All Others	10.8 EER	10.8 EER 11.0 IEER	0.2	11.5 EER 11.6 IEER	0.1	11.5 EER 11.9 IPLV	12.0 EER 12.4 IPLV
$\geq 240k$ - $< 760k$	Electrical Resistance	Not defined	10.0 EER 10.1 IEER	0.1	Not defined	----	10.7 EER	11.0 EER
	All Others	Not defined	9.8 EER 9.9 IEER	0.1	Not defined	----	10.5 EER 10.9 IPLV	10.8 EER 12.0 IPLV
$\geq 760k$	Electrical Resistance	Not defined	9.7 EER 9.8 IEER	0.1	Not defined	----	9.9 EER	10.4 EER
	All Others	Not defined	9.5 EER 9.6 IEER	0.1	Not defined	----	9.7 EER 11.0 IPLV	10.2 EER 11.0 IPLV

Note: CEE specification cites a 0.2 increase in EER for electrical resistance heating sections.